EXHIBIT B

'817 Cycle D Performance; Vapor Leak Data; Flame Boundary Diagram

This exhibit contains a summary of thermodynamic refrigeration cycle calculations, refrigerant leakage scenarios, and a flame boundary plot of experimental data for mixtures of R125, R134a, and C3-C5 hydrocarbons. From these data, one learns that over the range of the compositions of paragraph 4, the compositions achieve similar cooling capacity and energy efficiency as R22, and are nonflammable under all leakage scenarios as required for evaluation by ASHRAE Standard 34-2004, addendum p. As additional information and support of the nonflammability of the selected range of compositions of paragraph 4, the vapor leakage and flammability test data submitted to ASHRAE for a refrigerant mixture subset of the compositions of paragraph 4 are included in this exhibit.

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Performance calculations using NIST Cycle D version 2.2

Air conditioning system conditions for calculations following:

condenser avg temp 45 C	1.5 C temperature equivalent of suction and discharge lines pressure drop
evaporator avg temp 7.2 C	fan power: indoor .47 kW; outdoor .26 kW
8.3 C subcooling	controls power: .1 kW
11.0 C superheat	electric motor efficiency: .85
70% of isentropic efficiency	compressor volumetric efficiency: .82

Refrigerant compositions, wt %				wt%	Temp Glide degrees C	suction press.	discharge pressure	discharge temp.	cooling capacity	system efficiency	relative to R22		rel. to R22
R22	R125	R134a	R600a	R600	cond/evap	kPa	kPa	degrees C	KJ/m3	COP	capacity	COP	suction press.
100					0	**597**	1791	100.3	**3173**	2.51	1	1	1
	60	36	4		2.5/2.6	567	1765	74	2911	2.49	0.92	0.99	0.95
	60	37	3		2.5/2.7	566	1767	74.3	2915	2.49	0.92	0.99	0.95
	61	35	4		2.5/2.6	571	1776	73.9	2926	2.48	0.92	0.99	0.96
	61	36	3		2.5/2.7	570	1779	74.1	2930	2.48	0.92	0.99	0.95
	62	34	4		2.5/2.6	576	1787	73.7	2940	2.48	0.93	0.99	0.96
	62	35	3		2.5/2.7	575	1790	74	2944	2.48	0.93	0.99	0.96
	64	32	4		2.4/2.5	585	1810	73.5	2969	2.48	0.94	0.99	0.98
	64.9	31.7	3.4		2.4/2.6	588	1822	73.5	2986	2.48	0.94	0.99	0.98
	65.1	31.5	3.4		2.4/2.6	589	1824	73.5	2988	2.48	0.94	0.99	0.99
	65	32	3		2.4/2.6	589	1824	73.7	2988	2.48	0.94	0.99	0.99
	66	30	4		2.4/2.5	594	1832	73.3	2997	2.47	0.94	0.98	0.99
	66	31	3		2.4/2.5	593	1836	73.5	3003	2.47	0.95	0.98	0.99
	67	29	4		2.3/2.4	598	1844	73.1	3012	2.47	0.95	0.98	1.00
	67	30	3		2.3/2.5	598	1847	73.4	3018	2.47	0.95	0.98	1.00
	68	28	4		2.3/2.4	603	1855	73	3026	2.47	0.95	0.98	1.01
	68	29	3		2.3/2.5	603	1859	73.3	3033	2.47	0.96	0.98	1.01
	69	27	4		2.3/2.4	608	1867	72.9	3041	24.7	0.96	9.84	1.02
	69	28	3		2.3/2.4	607	1871	73.2	3048	2.47	0.96	0.98	1.02
R417A	46.6	50		3.4	3.3/3.2	492	1574	76.1	2657	2.53	0.84	1.01	0.82

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Vapor Leak Test Data and Flammability Test Results for Application 10/632,817 Compositions

Test procedures per ASHRAE Standard 34-2004, addendum p and ASTM E681

Any refrigerant having a lower and upper flame limit with the ASTM E681 test is classified as flammable

The bolded numbers are those compositions with highest hydrocarbon content

Refrigerant	Vapor Leak		Original wt%		after 50% leak		after 70% leak		after 90% leak		flame test results % refrigerant in air	
Designation	Temp., C	Composition	liquid	vapor	liquid	vapor	liquid	vapor	liquid	vapor	LFL	UFL
A	-33	R125	63.3	**76.6**	55	69.6					nonflammable per	
		R134a	32.5	**17.8**	41.6	25.3					flame boundary plot	
		isobutane	4.2	**5.6**	3.4	5.1						
B	-33	R125	67.8	**80.1**	58.3	74.5					nonflammable per	
		R134a	28.1	**14.5**	38.4	20.6					flame boundary plot	
		isobutane	4.1	**5.4**	3.3	4.9						

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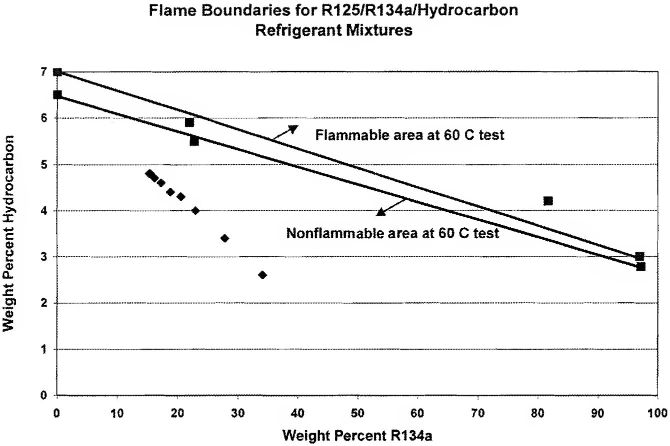

This plot of flame boundaries for refrigerant mixtures of R125, R134a, and C3-C5 hydrocarbons was developed from testing of refrigerant mixtures using the procedures for flame testing prescribed by ASHRAE Standard 34-2004, addendum p, and ASTM E681. The area between the flammable and nonflammable lines represents the area of uncertainty, and mixture compositions falling into this area would need to be tested for flammability. Note that R125 is not shown on the plot, as only the hydrocarbon and R134a content are necessary to fully characterize the mixture (the R125 content is simply the remaining amount).

The data for the flame boundary plot were determined by DuPont using the ASHRAE and ASTM procedures described above, over many years, including tests conducted after 2003. This chart was not made available to the public by DuPont until about June 2006.

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Flammability Information	(ASHRAE Std 34 Section 8.7.2)

Fractionation Analysis – Lab Test Procedure

Test mixture

The refrigerant mixture to be evaluated has composition and manufacturing tolerances as follows:

Pentafluoroethane	R125	65.1% +0.9/-1.1%
1,1,1.2-Tetrafluoroethane	R134a	31.5% ±1.0%
Isobutane	R600a	3.4% +0.1/-0.4%

From these tolerances the worst case formulation (WCF) will have the highest R600a content, the lowest R125 content (since R125 has the greatest flame suppressant properties), and the balance will be R134a. Therefore the WCF is: 65.0% R125 + 32.5% R134a + 3.5% R600a.

Test apparatus for worst case fractionated formulation (WCFF)

The vessel to hold the refrigerant mixture was a stainless stirred autoclave of 2000 cubic centimeter internal volume, fitted with an internal thermocouple, a liquid sampling dip tube, and a vapor sampling tube. The autoclave was submerged in a bath of a mixture of water/glycol. The bath temperature was controlled by a heater/circulator, with cooling provided from a laboratory constructed refrigeration system . A paddle stirrer placed under the evaporator coils in the bath provided for circulation of the cooling fluid.

Once the test vessel had been charged with refrigerant, it was brought to the appropriate temperature. Initial liquid and vapor samples were taken for analysis. The leaked refrigerant was removed from the vessel as vapor at a rate of 2% of the total mass charged per hour. The volume of vapor removed was measured in a calibrated soap film flowmeter. The mass was calculated using the measured ambient temperature and pressure, and the gas density. As shown in the table of lab test data, samples were taken after 2.7% of the mass had leaked, followed by samples taken at approximately 10% mass intervals. This continued until either the internal pressure of the vessel was at ambient pressure, no liquid phase remained, or 95% of the mass had leaked.

Analytical

Compositions of the refrigerant samples were analyzed by gas liquid chromatography (GLC). The chromatograph was a Hewlett Packard 6890A gas chromatograph equipped with a thermal conductivity detector, gas sampling valves, and connected to a liquified gas sampling/handling system. The chromatograph used a 1.83 m x 3 mm glass column packed with 80-100 mesh Porapak T.

GC standards were made for the R125/R134a/R600a mixture, with R125 and R134a within 0.1% of the goal percentages, and R600a within 0.02% of the percentage. Calibration of the GC was by three separate vaporizations and samplings of the calibration standard. A calibration check sample was run each day that analyses were to be performed.

TABLE 1 **Laboratory Test Data at -33.0 C with 90% fill**
(of maximum DOT fill volume)

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	64.0	32.5	3.5	79.9	15.3	4.8
2.7	64.5	32.1	3.4	79.75	15.5	4.75
11.2	63.4	33.4	3.2	79.1	16.2	4.7
21.7	61.7	35.2	3.1	78.1	17.3	4.6
32.3	59.9	37.2	2.9	76.9	18.8	4.4
43.4	57.2	40.2	2.6	75.2	20.5	4.3
54.6	53.8	44.0	2.2	73.1	22.9	4.0
65.7	47.4	50.9	1.7	68.8	27.8	3.4
76.8	40.5	58.5	1.0	63.3	34.1	2.6
84.1	30.5	69.0	0.5	54.0	44.5	1.5
87.4*	26.8	72.7	0.5	49.9	48.9	1.2

* ambient pressure

TABLE 2 **Modelled Leak Scenario at -33.2C With a 90% Fill**

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	63.94	32.57	3.50	79.17	16.20	4.63
1	63.79	32.73	3.48	79.07	16.30	4.63
2	63.63	32.90	3.47	78.98	16.40	4.63
2.7	63.52	33.02	3.46	78.91	16.47	4.62
10	62.29	34.34	3.37	78.15	17.25	4.60
20	60.36	36.42	3.22	76.95	18.51	4.55
30	58.07	38.90	3.03	75.48	20.05	4.47
40	55.29	41.92	2.80	73.65	21.99	4.35
50	51.80	45.70	2.50	71.27	24.56	4.17
60	47.28	50.61	2.11	68.00	28.14	3.87
70	41.07	57.32	1.61	63.09	33.57	3.35
80	31.92	67.13	0.95	54.62	42.97	2.41
86.6*	23.05	76.48	0.47	44.37	54.17	1.46

*pressure = 101.33 kPa

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TABLE 3 Modelled Leak Scenario at 0C With a 90% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	63.87	32.63	3.50	76.14	19.90	3.96
2	63.62	32.90	3.49	75.96	20.08	3.96
3	63.49	33.03	3.48	75.86	20.18	3.96
10	62.52	34.04	3.44	75.17	20.87	3.96
20	60.97	35.66	3.37	74.03	22.02	3.95
30	59.14	37.57	3.29	72.67	23.39	3.94
40	56.95	39.87	3.18	71.02	25.07	3.91
50	54.26	42.71	3.03	68.93	27.21	3.86
60	50.81	46.37	2.82	66.18	30.06	3.77
70	46.17	51.32	2.52	62.29	34.12	3.59
80	39.35	58.60	2.05	56.17	40.60	3.23
90	27.84	70.91	1.24	44.26	53.38	2.37
95	18.24	81.10	0.67	32.14	66.36	1.49

TABLE 4 Modelled Leak Scenario at 23C With a 90% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	63.83	32.67	3.50	73.91	22.40	3.69
2	63.62	32.89	3.49	73.74	22.57	3.69
3	63.51	33.00	3.49	73.65	22.65	3.69
10	62.7	33.83	3.47	73.02	23.28	3.70
20	61.39	35.17	3.44	71.99	24.31	3.71
30	59.87	36.73	3.40	70.78	25.52	3.71
40	58.06	38.60	3.34	69.32	26.98	3.71
50	55.84	40.90	3.26	67.50	28.81	3.69
60	53.03	43.82	3.14	65.15	31.19	3.66
70	49.27	47.77	2.96	61.92	34.50	3.58
80	43.78	53.57	2.65	56.99	39.61	3.40
90	34.40	63.58	2.02	47.87	49.22	2.92
95	26.24	72.31	1.45	38.98	58.70	2.32

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TABLE 5 Modelled Leak Scenario at 54.4C With a 90% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	63.89	32.61	3.50	70.49	26.02	3.49
1	63.81	32.69	3.50	70.42	26.09	3.49
2	63.73	32.77	3.50	70.35	26.15	3.49
3	63.65	32.85	3.5	70.28	26.22	3.5
10	63.05	33.45	3.5	69.78	26.72	3.50
20	62.1	34.4	3.5	68.97	27.51	3.52
30	61	35.51	3.49	68.03	28.44	3.53
40	59.7	36.82	3.48	66.91	29.55	3.54
50	58.12	38.42	3.46	65.54	30.91	3.55
60	56.13	40.45	3.42	63.80	32.65	3.55
70	53.48	43.16	3.35	61.46	35.00	3.53
80	49.64	47.15	3.22	58.01	38.52	3.47
85.9*	46.27	50.67	3.05	54.92	41.70	3.38

*100% quality

TABLE 6 Modelled Leak Scenario at -33.2C With a 15% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	63.19	33.37	3.44	78.71	16.67	4.62
2	62.87	33.71	3.41	78.51	16.88	4.61
3	62.71	33.89	3.40	78.41	16.98	4.61
10	61.49	35.21	3.30	77.66	17.77	4.58
20	59.50	37.35	3.14	76.41	19.08	4.52
30	57.14	39.91	2.95	74.89	20.69	4.43
40	54.28	43.02	2.70	72.98	22.72	4.29
50	50.71	46.89	2.40	70.51	25.40	4.09
60	46.10	51.89	2.01	67.11	29.12	3.77
70	39.88	58.60	1.52	62.07	34.68	3.25
80	31.02	68.04	0.94	53.65	43.95	2.41
86.7 *	22.87	76.61	0.53	44.06	54.33	1.62

* pressure = 101.3 kPa

TABLE 7 Modelled Leak Scenario at 0C With a 15% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	62.09	34.49	3.42	74.85	21.20	3.96
2	61.82	34.78	3.41	74.65	21.40	3.95
3	61.68	34.92	3.40	74.55	21.50	3.95
10	60.65	36.00	3.35	73.80	22.26	3.94
20	59.00	37.73	3.27	72.58	23.50	3.92
30	57.07	39.77	3.16	71.12	25.00	3.89
40	54.76	42.22	3.02	69.34	26.83	3.83
50	51.93	45.23	2.84	67.10	29.15	3.75
60	48.35	49.04	2.60	64.18	32.21	3.61
70	43.64	54.09	2.27	60.13	36.50	3.38
80	37.10	61.09	1.81	54.06	42.97	2.98
87.74 *	30.05	68.61	1.35	46.75	50.77	2.48

* 100% quality

TABLE 8 Modelled Leak Scenario at 23C With a 15% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	61.27	35.30	3.43	71.89	24.41	3.70
2	61.03	35.54	3.42	71.71	24.59	3.70
3	60.92	35.67	3.42	71.61	24.69	3.70
10	60.04	36.57	3.39	70.92	25.39	3.70
20	58.63	38.03	3.34	69.79	26.53	3.69
30	56.99	39.74	3.27	68.46	27.87	3.67
40	55.05	41.77	3.18	66.86	29.50	3.64
50	52.70	44.24	3.06	64.89	31.52	3.58
60	49.75	47.36	2.89	62.38	34.13	3.49
70	45.91	51.44	2.65	58.99	37.67	3.34
75.05 *	43.49	54.04	2.48	56.78	40.00	3.22

* 100% quality

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TABLE 9 Modelled Leak Scenario at 60C With a 15% Fill

Mass Percent Leaked	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
0	60.91	35.60	3.49	67.16	29.33	3.51
2	60.75	35.76	3.49	67.02	29.47	3.51
3	60.67	35.84	3.49	66.95	29.54	3.51
10	60.07	36.45	3.48	66.44	30.05	3.51
20	59.12	37.41	3.47	65.61	30.88	3.51
30	58.02	38.54	3.45	64.65	31.84	3.51
40	56.73	39.86	3.41	63.51	32.99	3.50
44.3 *	56.10	40.50	3.40	62.97	33.54	3.49

- 100% Quality

TABLE 10 Modelled Charge/Recharge Calculations 23C With a 15% Fill
20% leak and recharge for each cycle; end of cycle data shown

End of Charge/Leak Cycle	Liquid Composition (Wt. %)			Vapor Composition (Wt. %)		
	R-125	R-134a	R-600a	R-125	R-134a	R-600a
End of 20% leak	58.99	37.66	3.35	70.07	26.24	3.69
Cycle 1	57.46	39.25	3.29	68.84	27.49	3.68
Cycle 2	56.19	40.57	3.24	67.80	28.54	3.66
Cycle 3	55.14	41.67	3.19	66.93	29.43	3.64
Cycle 4	54.27	42.59	3.15	66.21	30.17	3.63
Cycle 5	53.55	43.34	3.11	65.61	30.79	3.61

Fractionation Analysis

Fractionation analysis was carried out according to instructions in Addendum p to ASHRAE Standard 34-2004. The analysis included storage leaks at 90% fill (of maximum DOT fill volume) at four temperatures, equipment leaks at 15% fill (of maximum DOT fill volume) at four temperatures, and charge/recharge through 5 leakage events of 20% of each refrigerant charge. The model calculated data are presented in the accompanying tables, and demonstrate that the WCFF occurs at the condition of 90% fill (DOT), -33.2° C (10° C above the –43.2°C boiling point), and is the vapor composition.

The fractionation analysis model calculations were performed with the computer program Refleak 2.1 from National Institute of Standards and Technology. Refleak 2.1 has been used in fractionation analysis for other mixtures of R125/R134a/R600a as reported in ASHRAE Standard 34 submittals for R422A, R422B, and R422C, each presenting experimental verification of Refleak 2.1 calculated compositions.

For the present verification of the WCFF, laboratory tests were conducted at the condition of 90% fill (DOT) and –33.0° C. Beginning with the WCF of 64.0% R125 + 32.5% R134a + 3.5% R600a, the WCFF as calculated with Refleak 2.1 was the initial vapor having the composition of 79.2% R125 + 16.2% R134a + 4.6% R600a. The laboratory test data showed the WCFF was also the initial vapor at these conditions, with a slightly different composition of 79.9% R125 + 15.3% R134a + 4.8% R600a. Based on the higher amount of R600a, this composition was chosen as the WCFF for flammability testing.

A plot of the R600a concentrations in the liquid and vapor phase during vapor leakage of the WCF composition is in Figure 2, showing the close agreement of the Refleak 2.1 calculations and the test data. The tables of model calculations and lab test data are Tables 1-10. Note that the lab tests were run at –33.0° C instead of –33.2° C, (10° C above the –43.2° C boiling point of the refrigerant mixture). Releak 2.1 calculations showed the difference of 0.2° C caused small composition differences in the second decimal place for isobutane composition.

Figure 3 shows the flame boundaries for all mixtures of R125/R134a/R600a for the 60° C test per ASHRAE SSPC34-2004. This graph can be used with the data from Tables 1-10 to verify that all the compositions in the tables are nonflammable. Also shown in Figure 3 are the vapor phase compositions during vapor leakage of the WCF composition of 64% R125 + 32.5% R134a + 3.5% R600a, being a considerable distance from the flame boundary.

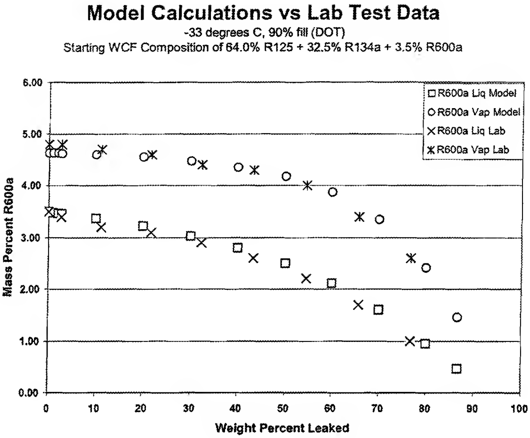

Figure 2

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Flame Boundaries for R125/R134a/R600a, plus
Vapor Compositions at -33.0 C and 90% DOT fill with vapor leakage
for WCF of 64% R125 + 32.5% R134a + 3.5% R600a

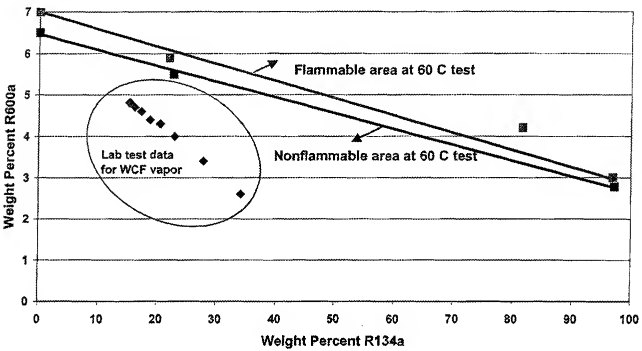

Figure 3

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Flame Propagation

Flammability Testing

The WCF and WCFF were tested for flammability according to ASTM E681- 2001 test procedure as required in ASHRAE Standard 34-2004 and described in Addendum p to ASHRAE Standard 34-2004. Test conditions were 100° C and 50% relative humidity for the WCF and 60° C and 50% relative humidity for the WCFF.

The WCF was the mixture of 64.0% R125 + 32.5% R134a + 3.5% R600a. The WCFF was the mixture of 79.9% R125 + 15.3% R134a + 4.8% R600a. Both were tested and found to be nonflammable. To further demonstrate the nonflammability of mixtures near these concentrations, a mixture of 78.0% R125 + 17.0% R134a + 5.0% R600a was tested at the 60° C test condition and found to be nonflammable. The tests were conducted in the DuPont Fluoroproducts analytical laboratory at Chestnut Run Plaza, Wilmington, DE.

<u>Apparatus and Procedure</u>
The test apparatus and procedure were according to ASTM E681-2001 and Addedum p to ASHRAE Standard 34-2004. The test vessel was a 12 liter spherical glass flask. The ignition source was a spark from a transformer secondary rated at 15 kv/30 ma with a 0.4 second spark duration. The electrodes were 1 mm, L-shaped tungsten wire with 0.25 inches gap. The ignition source was placed at a height of 1/3 the diameter of the flask from the bottom of the flask. Tests were run at 100° C and at 60° C, with humidity of the air adjusted to 50 ± 0.1% at 23.0° C. The air humidity control system is located in a separate box. A stirrer was installed in the flask for vapor mixing. Mixture samples were prepared with concentrations determined gravimetrically and then confirmed with gas chromatograph analyses. Flame propagation was determined as described in Addendum 34p, which is the 90 degree fan criteria. After each test, air was introduced to purge the residual refrigerant vapors, followed by evacuation to below one torr. Figure 1 is a schematic of the basic test vessel. Atmospheric pressures during tests of the three refrigerant compositions varied from 755 to 770mm Hg. Flask temperatures were measured and controlled within ±0.1°C of goal temperatures.

<u>Sample preparation</u>
The gravimetric and gas chromatograph data for the three samples are in the following table:

WCF	wt.% R125	wt.% R134a	wt.% R600a
goal	64.0	32.5	3.5
by weight	64.003	32.499	3.498
by GC	64.000	32.502	3.498

WCFF	wt.% R125	wt.% R134a	wt.% R600a
goal	79.9	15.3	4.8

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by weight	79.902	15.296	4.802
by GC	79.903	15.296	4.801

	wt.% R125	wt.% R134a	wt.% R600a
goal	78.0	17.0	5.0
by weight	78.001	17.001	4.998
by GC	78.002	17.001	4.997

Test results
All three mixtures were tested and found nonflammable, as earlier indicated. The test information is summarized following.

mixture wt.% composition	vol.% tested	test temp., ° C	test results
64.0% R125 + 32.5% R134a + 3.5% R600a	4-18%	100	nonflammable
79.9% R125 + 15.3% R134a + 4.8% R600a	6-18%	60	nonflammable
78.0% R125 + 17.0% R134a + 5.0% R600a	8-18%	60	nonflammable

Flame observations during these tests showed "weak flame" behavior, with no tendencies to rise toward the top of the flask. Previous DuPont Fluoroproducts flammability testing of binary and ternary compositions of the refrigerants R125, R134a, and R600a are consistent with the above test results, and show that any flammability on-set (if an LFL exists) occurs at values of 10-11 volume % mixture in air, with the UFL having values of 12-15%.

Conclusions
The worst case formulation of 64.0% R125 + 32.5% R134a + 3.5% R600a was nonflammable. The worst case fractionated formulation of 79.9% R125 + 15.3% R134a + 4.8% R600a was nonflammable.

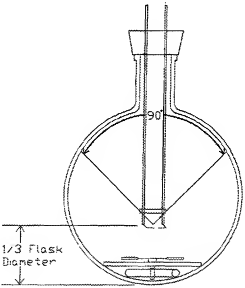

Figure 1 12 liter test vessel

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